

NEW DISTRIBUTION RECORD OF *COSCINODON CRIBROSUS*  
(HEDW.) SPRUCE (MUSCI, GRIMMIACEAE) IN CHINA

НОВАЯ НАХОДКА *COSCINODON CRIBROSUS* (HEDW.) SPRUCE  
(MUSCI, GRIMMIACEAE) В КИТАЕ

XUE-LIANG BAI<sup>1</sup> & BENITO C. TAN<sup>2</sup>

ХУ-ЛИАНГ БАЙ, БЕНИТО Ч. ТАН

Abstract

*Coscinodon cribrosus* (Hedw.) Spruce is reported for the first time from Inner Mongolia Province of China based on a recent collection made from (Mt.) Helan Shan (38° 48' N, 105° 54' E). It is the second locality known from mainland China. Detailed description and illustration of the newly discovered Inner Mongolian specimens are given. The record of this species from Taiwan is quite out of its range and habitat.

Резюме

*Coscinodon cribrosus* (Hedw.) Spruce впервые приводится для китайской провинции Внутренняя Монголия по недавним сборам с горы Хелан Шан (38° 48' N, 105° 54' E). Это второе местонахождение данного вида в континентальном Китае. Приводится подробное описание вида и иллюстрации по образцам из Внутренней Монголии. Отмечено, что местонахождение данного вида на Тайване находится далеко за пределами его географического ареала, где он, кроме того, и растет не во вполне типичном местообитании.

*Coscinodon* is a genus with 9 species: *Coscinodon arctolimnius* (Steere) Steere, *C. australis* Dix. & Sainsb., *C. bolivianus* Broth., *C. calyptratus* (Drumm.) C. Jens. in Kindb., *C. cribrosus* (Hedw.) Spruce, *C. hartzii* C. Jens., *C. humilis* Mild., *C. pseudocribrosus* Hastings and *C. yukonensis* Hastings (Beever & al., 1992; Brotherus, 1924; Churchill & al., 2000; Hastings 1996, 1999; Hasting & Deguchi 1997; Ireland & al. 1987; Iwatsuki 1991; Wijk & al., 1959, 1969). Of these, *C. cribrosus* seems to be the most widespread having been reported from Europe, North Africa, North America, Greenland, Russian Siberia, Altai and Far East, Central Asia, India (Darjeeling) and Kashmir (Anderson & al., 1990; Corley & al., 1981; Gangulee 1972; Ignatov & Afonina 1992; Ignatov & Cao 1994), and recently from China and Mongolia (Cao & al., 1991; Redfearn & al., 1996; Muñoz 1998; Tsegmed 2001a). Interestingly, in the newly published flora of Mongolian mosses, a second species of *Coscinodon*, *C. arctolimnius* ssp. *higuchii* Hastings & Deguchi, was overlooked (Tsegmed 2001b). The same subspecies is also

reported from Pakistan (Hastings and Deguchi 1997).

Cao & al. (1991) published the first record of *C. cribrosus* (Hedw) Spruce from China based on a sterile specimen collected by T. Koponen from Taiwan. However, the species record for China was made much earlier in 1898 by C. Müller on the basis of a Giraldi's collection from Shanxi Province which he had described as *Grimmia sinensi-anodon* C. Muell. (Muñoz 1998). In Cao & Vitt (1986), this latter species was mistakenly reduced to a synonym of *Grimmia caespitica* (Brid.) Jur. The taxonomic error was eventually corrected by Muñoz (1998).

Recently, we studied some bryophyte collections made in 1993 by the first author from (Mt.) Helanshan in Inner Mongolia Province and found two typical specimens of *C. cribrosus* (Hedw.) Spruce with sporophytes. Since there is a confusion concerning the correct identity of this species in the published Chinese literature (see discussion below), we present herewith a detailed description based on the two newly collected specimens from Helanshan.

<sup>1</sup> – Department of Biology, Inner Mongolia University, Hohhot 010021, China

<sup>2</sup> – Department of Biological Sciences, National University of Singapore, Singapore 119260

**Coscinodon cribrosus** (Hedw.) Spruce, Ann. Mag. Nat. Hist. ser. 2, 3: 491. 1849; Gangulee, Mosses East India Adjacent Region, vol. I., fasc. 3: 787-790, fig. 5. 1994. Figs. 1-11.

*Grimmia cribrosa* Hedw., Sp. Musc. 76. 1801; Crum and Anderson, Mosses East N. Amer., vol. 1: 419. 1981.

Small plants in dense tufts, dark-green or blackish-green, 5-7 mm high, forked or fasciculately branched. Stems erect, rounded in transverse section, 0.16-0.18 mm in diameter, central strand present, sclerodermis usually weakly developed and composed of substereid cells. Leaves crowded, larger at the stem or branch tip comosely tufted, appressed to stem when dry, erect-spreading when moist, 2.0-2.6 mm long, 0.3-0.55 mm wide, broadly ovate to ovate-lanceolate, acuminate and ending in a well-developed, hyaline, subentire awn (about 0.7-1.0 mm long), concave, and keeled, with three major "keels" formed by the single costa and two thickened plicae running parallel to it nearly through the whole length of the lamina; margins entire, incurved, slightly cucullate apically; costa percurrent, prominent at back, 52.0-59.8  $\mu\text{m}$  wide; upper lamina bistratose, greenish, cells subquadrate and rounded-quadrate, 7.8-10.4  $\mu\text{m}$  in diameter, smooth, thin-walled, not nodose; lower lamina unistratose, cells subquadrate to short-rectangular, 23.4-52  $\mu\text{m}$  long, 9.1-15.6  $\mu\text{m}$  wide, with thin longitudinal and thick transverse walls, not nodose. Dioicous. Perichaetial leaves larger than stem leaves. Seta straight, 1-1.2 mm long; capsule immersed or slightly emergent, erect and symmetric, oblong-cylindric, orange-brown, smooth, 2.1-2.2 mm long, 0.6-0.7 mm in diameter; annulus none; operculum conic-rostrate, 0.75-0.9 mm long; peristome teeth large, erect lanceolate, with sieve-like perforation, orange-brown, densely papillose, 0.2-0.25 mm long. Spores 9-10.5  $\mu\text{m}$  in diameter, very finely papillose. Calyptra large, mitrate, plicate, covering the capsule to middle level or below.

Specimens examined: on exposed soil over rock, south slope of Helanshan, Suyuchou (38°48'N, 105°54'E), 2250m elev, 22 Jul 1993, X.-L. Bai 4345 & 4347 (Herb. HIMC).

*Coscinodon cribrosus* is easily distinguished from other species of Grimmiaceae by the following combination of features: (1) the

large calyptra with plicae that covers nearly the entire capsule reaching the middle part and below; (2) the cribose peristome teeth; (3) the seta 1-1.2mm long; (4) capsule immersed or slightly emergent; (5) the ovate-lanceolate leaves showing distinct longitudinal plicae on each side of the costa; (6) the upper leaf lamina bistratose while the lower lamina unistratose.

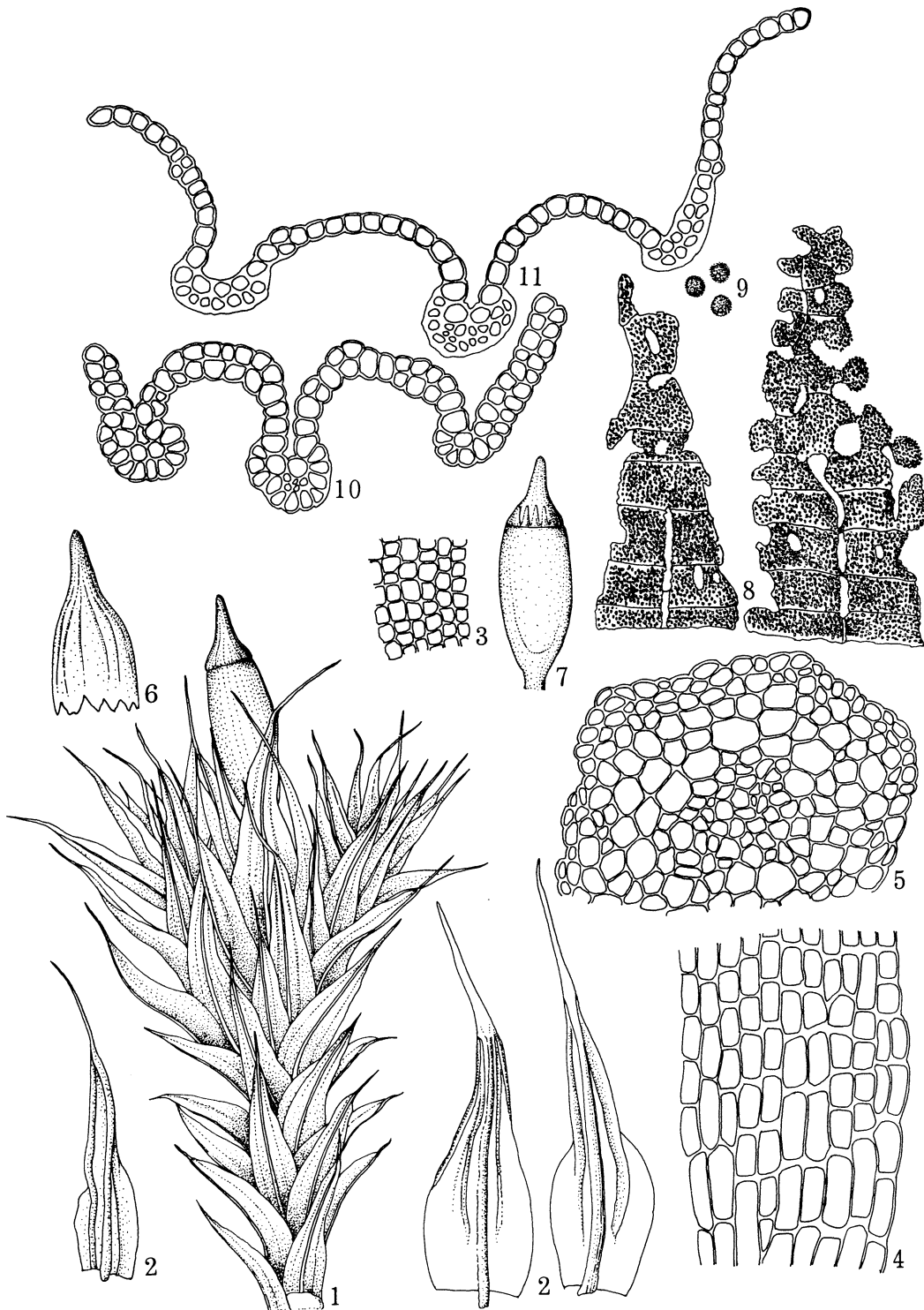
Sterile plants of *Grimmia caespiticia* (Brid.) Jur. can be confused with *Coscinodon cribrosus*. The former differs from the latter in the usually papillose upper laminal cells with nodose walls, and an exerted capsule (Loeske 1913; Muñoz 1998). In this regard, the illustrations of "*Grimmia caespiticia*" in Cao and Vitt (1986), which is based on the type of *Grimmia sinensi-anodon* C. Muell., is clearly a *Coscinodon cribrosus* as corrected by Muñoz (1998).

On the other hand, the published illustrations of sterile Taiwan plants determined as *Coscinodon cribrosus* by Cao & al. (1991) and reproduced in volume 3 of the English version of the Moss Flora of China (Grimmiaceae-Tetraphidaceae) did not include the diagnostic leaf characters of the species. The leaf outlines of the Taiwan specimen are shown to be oblong to narrowly lanceolate, instead of the more typical ovate-lanceolate, concave and somewhat cucullate leaves. Sporophyte was reportedly not seen in the Taiwan collection (Cao & al., 1991). According to Muñoz (personal comm., 2004) who has studied recently the Taiwan collection preserved at H, "the specimen has a very old, urceolate capsule, but no calyptra seen. The capsule has remnants of peristome teeth that are very wide at base as in *C. cribrosus*, but all are broken and lost. Leaf plication is also like the plication seen in the leaves of European specimens of *C. cribrosus*, although the leaves are a little longer."

*Coscinodon cribrosus* is commonly a xeric and boreal taxon. Its reported habitat in humid mountain in Taiwan is rather atypical (Cao *et al.* 1991).

#### ACKNOWLEDGEMENTS

We thank Dr. J. Muñoz for sharing with us his study notes on the Taiwan specimen of *C. cribrosus* and his constructive review of our manuscript.



Figs. 1-11. *Coscinodon cribrosus* (Hedw.) Spruce (based on X.-L. Bai 4345 & 4347): 1. Plant, x 14; 2. Leaves, x 28; 3. Upper leaf cells, x 280; 4. Cells at leaf base, x 280; 5. Cross section of stem, x 280; 6. Calyptra, x 14; 7. Capsule, x 14; 8. Portion of peristome, x 280; 9. Spores, x 280; 10. Cross-section of upper portion of leaf, x 280; 11. Cross-section of lower portion of leaf, x 280.

## LITERATURE CITED

- ANDERSON, L.E., H.A. CRUM & W.R. BUCK. 1990. List of mosses of North America north of Mexico. – *Bryologist* **93**: 448-499.
- BEEVER, J., K.W. ALLISON & J. CHILD. 1992. The Mosses of New Zealand. – *University of Otago Press, Otago*.
- BROTHERUS, V. F. 1924. Musci. – In: *A. Engler & K. Prantl (eds.), Die natürlichen Pflanzenfamilien, Bd. 10, Leipzig*.
- CAO, T., M.-J. LAI & T. KOPONEN. 1991. *Coscinodon* (Musci, Grimmiaceae) new to China. – *Acta Botanica Yunnanica* **13**(1): 30-32.
- CAO, T., & D.H. VITT. 1986. A taxonomic revision and phylogenetic analysis of *Grimmia* and *Schistidium* (Bryopsida, Grimmiaceae) in China. – *J. Hattori Bot. Lab.* **61**: 123-247.
- CHURCHILL, S., D. GRIFFIN III AND J. MUÑOZ. 2000. A checklist of the mosses of the tropical Andean countries. – *Ruizia* **17**: 1-203.
- CORLEY, M.F.V., A.C. CRUNDWELL, R. DÜLL, M.O. HILL AND A.J.E. SMITH. 1981. Mosses of Europe and the Azores; an annotated list of species, with synonyms from recent literature. – *J. Bryol.* **11**: 609-689.
- GANGULEE, H.C. 1972. Mosses of Eastern India, vol. 1. – *Calcutta*.
- HASTINGS, R.I. 1996. The genus *Coscinodon* (Bryopsida, Grimmiaceae) in South America, including a new species. – *Bryologist* **99**: 418-427.
- HASTINGS, R.I. 1999. Taxonomy and biogeography of the genus *Coscinodon* (Bryopsida, Grimmiaceae) in North America, including a new species. – *Bryologist* **102**: 265-286.
- HASTINGS, R.I. & H. DEGUCHI 1997. Taxonomy of *Coscinodon arctolimnius* (Bryopsida, Grimmiaceae) including a new subspecies from Asia. – *Bryologist* **100**: 50-55.
- IGNATOV, M.S. & O.M. AFONINA (eds.) 1992. Checklist of mosses of the former USSR. – *Arctoa* **1**: 1-85.
- IGNATOV, M.S. & T. CAO 1994. Bryophytes of Altai Mountains VI: The Family Grimmiaceae (Musci). – *Arctoa* **3**: 67-122.
- IRELAND, R.R., G.R. BRASSARD, W.B. SCHOFIELD & D.H. VITT. 1987. Checklist of the mosses of Canada II. – *Lindbergia* **13**: 1-62.
- IWATSUKI, Z. 1991. Catalog of the Mosses of Japan. – *Hattori Botanical Laboratory*.
- LOESKE, L. 1913. Die Laubmoose Europe. I. Grimmiaceae. – *Max Lande Berlin-Schöneberg*.
- MUÑOZ, J. 1998. A taxonomic revision of *Grimmia* subgenus *Orthogrimmia* (Musci, Grimmiaceae). – *Ann. Missouri Bot. Garden* **85**(3): 367-403.
- REDFEARN, P. L., Jr., B.C. Tan & S. He. 1996. A newly updated and annotated checklist of Chinese mosses. – *J. Hattori Bot. Lab.* **79**: 163-357.
- TSEGMED, T. 2001a. Checklist and distribution of Mosses in Mongolia. – *Arctoa* **10**: 1-18.
- TSEGMED, T. 2001b. Handbook of Mosses of Mongolia. – *Ulaan Bataar*.
- WIJK, R., VAN DER, W. D. MARGADANT & A. FLORSCHÜTZ 1959. Index Muscorum. vol. I. – *Utrecht*.
- WIJK, R., VAN DER, W. D. MARGADANT & A. FLORSCHÜTZ 1969. Index Muscorum. vol. V. – *Utrecht*.